OSWER Innovations Pilot

Anaerobic Digestion Facilities for Urban Food Waste

In December 2001, the Office of Solid Waste and Emergency Response (OSWER) initiated a series of innovative pilots to test new ideas and strategies for environmental and public health protection to make OSWER programs more efficient, effective, and user-friendly. A small amount of money is set aside to fund creative proposals testing approaches to waste minimization, energy recovery, recycling, and land revitalization that may be replicated across various sectors, industries, communities, and regions. We hope these pilots will pave the way for programmatic and policy recommendations by demonstrating the environmental and economic benefits of creative, innovative approaches to the difficult environmental challenges we face today.

BACKGROUND

Total food waste generated in the U.S. has increased to 25.9 million tons, rising to over 11% of the total waste stream. This percentage is much higher in New York City, where food wastes constitute 28% of the commercial waste stream and 58% of the residential waste stream. New York City exports at least 7 million tons of food and other organic wastes each year. As this waste decays, a large volume of greenhouse gas is released. New York City's food waste releases over 3 billion cubic feet of greenhouse gases annually. These greenhouse gases are 60% methane, which is 20 times more damaging to the atmosphere than carbon dioxide.

A key advantage of anaerobic digestion over conventional organic composting is the ability to convert organic matter to energy-rich biogas that can be used as a fuel or upgraded for use in clean fuel vehicles. Anaerobic digestion technology is an efficient, odor-free method to reduce waste volume, mitigate greenhouse gas associated with organic waste decay, and produce a valuable soil conditioner. Anaerobic digesters are a compact, practical tool for application in densely populated areas.

PILOT APPROACH

U.S. EPA Region 2, in partnership with Earth Pledge, the Council on the Environment of New York City (CENY), EcoCorp, the Earth Engineering Center at Columbia University, and Organica Biotech, Inc., will develop, test, and replicate an innovative small-scale anaerobic digestion (AD) facility for on-site installation at concentrated urban food waste sources. The Pilot also will explore emerging renewable energy applications for food waste methane. The pilot will test how the AD process can be improved through microbial enhancements, how facility construction can be streamlined to reduce footprints, and how cutting-edge renewable energy applications (such as fuel cells) can be integrated into facility design. Demonstration plants will be installed at three facilities. These facilities will produce baseline data such as optimal plant capacity, space requirements, and methane and soil conditioner production. Methane and nutrient-rich compost will be collected from the facilities and used to generate electricity and fertilizer. The prototype facility will focus on reliability, ease of assembly and maintenance, and low cost, with the goal of facilitating widespread transferability of the technology.

In conjunction with CENY's Environmental Education program, the Pilot will develop a hands-on education curriculum at the three Pilot sites. Pilot staff will publish a webpage within the Earth Pledge website dedicated to tracking the progress and results of the project.

INNOVATION

Organic waste disposal restrictions and government incentives have resulted in the development of hundreds of anaerobic digestion facilities in other countries to divert food waste from landfills, generate clean energy, and mitigate the release of greenhouse gas. There are

over 70 anaerobic digestion facilities in Europe that produce more than 300 megawatts of electricity (one megawatt of electricity can supply 1,000 homes). This project will develop the first anaerobic digestion facility of its kind in the U.S. The expertise of project partners, including EcoCorp, Organica, the Earth Engineering Center, and CENY, will be leveraged to develop and demonstrate the synergy of an innovative food waste diversion, greenhouse gas reduction, and resource recovery program, and to develop a replicable urban application of anaerobic digester technology.

BENEFITS

The pilot will demonstrate the feasibility of using anaerobic digestion to divert food waste from landfills, reduce greenhouse gas emissions, and generate value-added resource streams, including renewable energy, from a waste product. By diverting 365,000 pounds of food waste to anaerobic digestion facilities, the Pilot will eliminate the release of 350,000 ft^3 of methane, which has the energy equivalent of over 105,000 kilowatts of electricity. Based on Department of Sanitation figures of $234 per ton of disposal, diverting 365,000 pounds of food waste will result in over $42,000 in waste disposal cost savings.

CONTACTS

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For additional information, visit the EPA OSWER Innovations web site at: www.epa.gov/oswer/IWG.htm.

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